

## CLAIMS

1. A method of production of a dielectric ceramic composition having at least

5 a main component expressed by a formula  $Ba_mTiO_{2+n}$ , wherein m is  $0.995 \leq m \leq 1.010$ , n is  $0.995 \leq n \leq 1.010$ , and the ratio of Ba and Ti is  $0.995 \leq Ba/Ti \leq 1.010$ ,

a first subcomponent containing at least one compound selected from MgO, CaO, BaO, SrO, and  $Cr_2O_3$ ,

10 a second subcomponent containing at least one compound selected from  $SiO_2$ , MO (where M is at least one element selected from Ba, Ca, Sr, and Mg),  $Li_2O$ , and  $B_2O_3$ ,

a third subcomponent containing at least one compound selected from  $V_2O_5$ ,  $MoO_3$ , and  $WO_3$ , and

5 a fourth subcomponent containing an oxide of R (where R is at least one element selected from Y, Dy, Td, Gd, and Ho), wherein

the ratio of the subcomponents with respect to 100 moles of the main component is

20 first subcomponent: 0.1 to 3 moles,

second subcomponent: 2 to 12 moles,

third subcomponent: 0.01 to 3 moles,

fourth subcomponent: 0.1 to 10.0 moles (where, the number of moles of the fourth subcomponent is a ratio of R .  
25 alone),

said method of producing the dielectric ceramic composition comprising the step of:

30 mixing in said main component at least part of other subcomponents except for said second subcomponent to prepare a pre-calcination powder,

calcining the pre-calcination powder to prepare a calcined powder, and

35 mixing at least said second subcomponent in said calcined powder to obtain the dielectric ceramic composition having molar ratios of the subcomponents to the main

component of the above ratios.

2. The method of production of a dielectric ceramic composition as set forth in claim 1, obtaining a dielectric ceramic composition further containing a fifth subcomponent  
5 containing MnO and having a ratio of the fifth subcomponent to 100 moles of the main component of 0.05 to 1.0 mole.

3. The method of production of a dielectric ceramic composition as set forth in claim 1, obtaining a dielectric ceramic composition having a molar ratio of the third  
10 subcomponent to 100 moles of the main component of 0.01 to 0.1 mole.

4. The method of production of a dielectric ceramic composition as set forth in claim 2, obtaining a dielectric ceramic composition having a molar ratio of the third  
15 subcomponent to 100 moles of the main component of 0.01 to 0.1 mole.

5. The method of production of a dielectric ceramic composition as set forth in claim 1, wherein the pre-calcination powder is prepared so that the molar ratios of components contained in the pre-calcination powder (Ba+metal  
20 element of the first subcomponent)/(Ti+metal element of the fourth subcomponent) is less than 1, or (Ba+metal element of the fourth subcomponent)/(Ti+metal element of the first subcomponent) is over 1, and calcination is performed.

25 6. The method of production of a dielectric ceramic composition as set forth in claim 2, wherein the pre-calcination powder is prepared so that the molar ratios of components contained in the pre-calcination powder (Ba+metal element of the first subcomponent)/(Ti+metal element of the  
30 fourth subcomponent) is less than 1, or (Ba+metal element of the fourth subcomponent)/(Ti+metal element of the first subcomponent) is over 1, and calcination is performed.

7. The method of production of a dielectric ceramic composition as set forth in claim 1, wherein the first  
35 subcomponent is always contained in the pre-calcination

powder when preparing the pre-calcination powder.

8. The method of production of a dielectric ceramic composition as set forth in claim 2, wherein the first subcomponent is always contained in the pre-calcination powder when preparing the pre-calcination powder.

9. The method of production of a dielectric ceramic composition as set forth in claim 1, wherein the pre-calcination powder is calcined at a temperature of 500°C to less than 1200°C.

10. The method of production of a dielectric ceramic composition as set forth in claim 2, wherein the pre-calcination powder is calcined at a temperature of 500°C to less than 1200°C.

11. The method of production of a dielectric ceramic composition as set forth in claim 9, wherein the calcination is performed for a plurality of times.

12. The method of production of a dielectric ceramic composition as set forth in claim 10, wherein the calcination is performed for a plurality of times.

13. The method of production of a dielectric ceramic composition as set forth in claim 1, wherein a mean particle size of the main component is 0.1 to 0.7  $\mu\text{m}$ .

14. The method of production of a dielectric ceramic composition as set forth in claim 2, wherein a mean particle size of the main component is 0.1 to 0.7  $\mu\text{m}$ .

15. The method of production of a dielectric ceramic composition as set forth in claim 1, wherein at least 70 wt% of the calcined powder is used with respect to the entire dielectric material as 100 wt%.

16. The method of production of a dielectric ceramic composition as set forth in claim 2, wherein at least 70 wt% of the calcined powder is used with respect to the entire dielectric material as 100 wt%.

17. A method of production of an electronic device containing dielectric layers comprising forming dielectric

layers by using the dielectric ceramic composition obtained by the method set forth in claim 1.

18. A method of production of an electronic device containing dielectric layers comprising forming dielectric layers by using the dielectric ceramic composition obtained by the method set forth in claim 2.

19. A method of production of a multilayer ceramic capacitor comprised by alternately stacking interal electrodes comprised of Ni or Ni alloy and dielectric layers, where each of dielectric layers contains, in the molar ratios indicated,  $\text{BaTiO}_3$ : 100 moles, at least one of MgO and CaO: 0.1 to 3 moles, MnO: 0.05 to 1.0 mole,  $\text{Y}_2\text{O}_3$ : 0.1 to 5 moles,  $\text{V}_2\text{O}_5$ : 0.01 to 3 moles, and  $\text{Ba}_a\text{Ca}_{1-a}\text{SiO}_3$  (where the symbol (a) is a number from 0 to 1): 2 to 12 moles,

characterized by using at least 70 wt% of the material, which is premixed in  $\text{BaTiO}_3$  at least one of MgO, CaO and a compound forming MgO or CaO upon heat treatment, and pre-calcined at a temperature of 900°C to 1300°C, with respect to the entire dielectric material.

20. A method of production of a multilayer ceramic capacitor comprised by alternately stacking interal electrodes comprised of Ni or Ni alloy and dielectric layers, where each of dielectric layers contains, in the molar ratios indicated,  $\text{BaTiO}_3$ : 100 moles, at least one of MgO and CaO: 0.1 to 3 moles, MnO: 0.05 to 1.0 mole,  $\text{Y}_2\text{O}_3$ : 0.1 to 5 moles,  $\text{V}_2\text{O}_5$ : 0.01 to 3 moles, and  $\text{Ba}_a\text{Ca}_{1-a}\text{SiO}_3$  (where the symbol (a) is a number from 0 to 1): 2 to 12 moles,

characterized by using at least 70 wt% of the material, which is premixed in  $\text{BaTiO}_3$  at least one of MgO, CaO and a compound forming MgO or CaO upon heat treatment, MnO or a compound forming MnO upon heat treatment,  $\text{Y}_2\text{O}_3$  or a compound forming  $\text{Y}_2\text{O}_3$  upon heat treatment, and  $\text{V}_2\text{O}_5$  or a compound forming  $\text{V}_2\text{O}_5$  upon heat treatment, and pre-calcined at a temperature of 900°C to 1300°C, with respect to the entire dielectric material.

21. The method of production of a multilayer ceramic capacitor as set forth in claim 19, wherein a mean particle size of the main component is 0.2 to 0.7  $\mu\text{m}$ .

22. The method of production of a multilayer ceramic capacitor as set forth in claim 20, wherein a mean particle size of the main component is 0.2 to 0.7  $\mu\text{m}$ .

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	